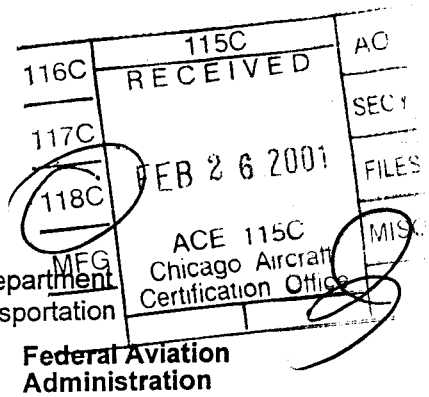

U.S. Department of Transportation
Federal Aviation Administration

Memorandum

Subject: **ACTION**: Equivalent Level of Safety to 14 CFR, Part 23, Sections 23.1143(g) and 23.1147(b); Cirrus Designs Corporation (CDC) SR20; Finding No. ACE-01-01

Date: FEB 1 4 2001

From: Manager, Chicago Aircraft Certification Office, ACE-115C

Reply to Attn. of: Mike Downs, ACE-118C 847-294-7870

To: Manager, Small Airplane Directorate, ACE-100

This memorandum requests that your office review and provide concurrence with the proposed finding of equivalent level of safety to the Engine and Mixture Controls requirements of Part 23, Sections 23.1143(g) and 23.1147(b).

Background:

The Cirrus SR-20 is a 2900-pound single-engine, four-place, fixed-gear airplane powered by a 200 hp reciprocating engine. It has a conventional tractor configuration and utilizes composites for the structure. Some unique features of the SR-20 include sidestick controls and a ballistic parachute recovery system. For its initial certifications, the SR-20 met Sections 23.1143(g) and 23.1147(b) by placing a spring on the throttle, which will bring the engine to full power in the case of a control disconnect. This is the only setting capable of continuing safe flight under all conditions. A landing is made by shutting off fuel to the engine once the airplane is in a position to make a safe landing at an airport. Now CDC has proposed a design change in which these requirements would be met by the use of positive retaining hardware.

Applicable Regulations:

The applicable regulations are 14 CFR, Part 23, Sections 23.1143(g) and 23.1147(b), which state:

> 23.1143(g): For reciprocating single-engine airplanes, each power or thrust control must be designed so that if the control separates at the engine fuel metering device, the airplane is capable of continued safe flight and landing.
>
> 23.1147(b): For reciprocating single-engine airplanes, each manual engine mixture control must be designed so that if the control separates at the engine fuel metering device, the airplane is capable of continued safe flight and landing.

Applicant Position:

Cirrus proposes that by the use of positive retaining hardware, the possibility of control separation at the engine can be eliminated. This results in a configuration that is at least as safe as a design that has a possibility of a control disconnect and then uses another device to continue flight. This proposal is similar to previous ELOS findings made on other aircraft. It is believed that eliminating any chance of a disconnected control through positive retention hardware is safer than the possibility of an aircraft unexpectedly going to full power. This is particularly true on the ground in the proximity of personnel or obstructions.

FAA Position:

Literal compliance with these requirements would normally involve the addition of spring devices on the engine. The original intent of these regulations was to provide a means to continue safe flight and

landing when a cable becomes disconnected. An ELOS finding related to the throttle and mixture controls was previously granted for the Cirrus SR-22 and Cessna models 172R and I82S. Cessna has also proposed a similar design for the 206H with features that include a higher level of attachment reliability, establishment of mandatory inspection intervals, inspection procedures and replacement criteria for the attachments.

Compensating Features:

The FAA finds that an ELOS will be provided to 14 CFR, Part 23, Sections 23.1143(g) and 23.1147(b) provided the following conditions are met:

An oversize AN970 washer holds the rod end captive even if wear causes the spherical bearing in the rod end to detach from the rod end body.

A castellated nut and cotter pin positively locks the entire hardware stack in place regardless of bolt rotation or fire.

An inspection step will be added to the maintenance manual to specifically check at required 1000 hours and annual inspections for the security and condition of the throttle and mixture control cotter pin, castellated nut and oversize washer.

Recommendation: We concur that the Cirrus SR20 proposed design of the engine and mixture controls attachments provide an ELOS to 14 CFR, Part 23, Sections 23.1143(g) and 23.1147(b).

Concurred by:

Bryan H Scott 2/13/01

Manager, Chicago Aircraft Certification Office, ACE-115C Date

For M. DAHL

2-8-2001

Manager, Standards Office, ACE-110 — Date

2/8/01

Manager, Small Airplane Directorate — Date
Aircraft Certification Service, ACE-100